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(54) Title: METHODS FOR FRAGMENTATION, LABELING AND IMMOBILIZATION OF NUCLEIC ACIDS

(57) Abstract: The invention relates to methods for fragmentation and/or labeling and/or immobilization of nucleic acids. More particularly, the invention relates to methods for fragmentation and/or labeling and/or immobilization of nucleic acids comprising of nucleic acids comprising labeling and/or cleavage and/or immobilization at abasic sites.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/15825

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C12Q 1/68

US CL : 435/6

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 435/6

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Please See Continuation Sheet

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|---------------------------|
| X | US 6,190,865 B1 (Jendrisak et al.), 20. February. 2001 (21.02.2001), see entire document. | 1-37, 44-61, 63-89 |
| Y | WO 02/29117 A2 (NUGEN TECHNOLOGIES, INC.) 11 April 2002 (11.04.2002), see abstract, and pp. 4-13. | 1-37, 44-61, |
| Y | Yoke and Dare, A. Detection of abasic sites and oxidative DNA base damage using an ELISA-like assay. Methods. 2000. vol. 22, pages 164-169. | 14, 16, 63, 73, 76 and 86 |
| Y | Stratagene Catalog, Gene Characterization Kits ; 1988. page 39. | 63-89 |

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"B" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

18 January 2005 (18.01.2005)

Date of mailing of the international search report

14 JUN 2005

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/15825

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.: 1-37, 44-61 and 63-89
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐
☐

- The additional search fees were accompanied by the applicant's protest.
No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

PCT/US03/15825

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-37, and 44-61, drawn to a method of labeling and fragmenting a polynucleotide.

Group II, claim(s) 38-43, drawn to a method for immobilizing a polynucleotide.

Group III, claim(s) 63-89, drawn to a composition.

The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:
The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The Uracil N-Glycosylase of claims 1-37, and 44-61 is not joined to the methods of at least claim 38 or the composition of at least claim 63. The Uracil N-Glycosylase is required to cleave a base portion of dUTP. This is not a special technical feature which joins the claimed inventions because Jendrisak et al. (USPN 6,190,865 B1, 20 February 2001) teach the Uracil N-Glycosylase (see col. 5 lines 43-64). The methods of at least claim 38, and the composition of at least claim 63 are not limited in scope so as to require Uracil N-Glycosylase and therefore are not joined to claims 38-43 and 63-89 by a special technical feature.

Continuation of B. FIELDS SEARCHED Item 2:

NPL

science direct, medline